

Helmet Types and Safety Information

a report from the Windy City Rollers' Training Chairs

There are three types of helmets on the heads of WCR skaters at this time: soft-foam helmets, hard-foam helmets, and hockey helmets. Each of these helmets protects the head using a different technology, and offer varying degrees and types of protection. **It is the opinion of WCR Training that all skaters should wear hockey helmets.** Skaters can find adequate single-impact protection from a CPSC certified helmet, but this helmet should be replaced several times annually following any significant impact. WCR Training does not recommend the use of 2-stage foam lined helmets for any skaters. Additionally, all helmets should be visually inspected prior to each wear, and should be free of visible cracks, have properly adjusted straps, and firmly affixed foam. **It should be noted that there is no helmet - not a single one - which can prevent a concussion.**

What is a significant impact? S-One, Pro-Tec, and Triple 8 were all asked this question, and none were able to provide a solid metric, except for S-One, who defined it in the infographics below. There is no single definition across the manufacturers as to what a significant impact is, so it is best to be safe rather than sorry. Assume that if you have hit your head, you have had a significant impact. If you recall throwing your helmet across the room, that probably also counts. The bottom line is that unless you have a hockey helmet, your helmet is not built or tested for multiple impacts.

Helmet Sizing is also a key factor in the level of protection offered by a helmet. A helmet with an improper fit is less likely to stay in position and therefore can not always offer adequate protection. When in doubt as to the fit of your helmet or when purchasing a new helmet model, it is best to get fitted at your local retailer. They are educated in proper fit and sizing, and can help you find the right helmet.

Types of Helmets

Hockey Helmets have a hard plastic shell and an EPP liner affixed with glue. Examples of hockey helmets are Bauer 4500, 5100, etc; Cascade M11; and Easton S-series.

Hockey helmets pass HECC standards and are not tested by the CPSC. The protective liner, EPP, is expanded poly-propylene and

this type of foam is more responsive and bounces back to it's original condition. Hockey helmets are designed, and tested for, multiple impacts over time. These helmets are tested by dropping them (with a head-form inside) 3 different times in the same location, and repeating this test in several locations. They should be replaced when they are showing signs of wear (cracked shell, padding becoming unglued) or upon their expiration date (6.5 years after testing). Hockey helmets are held to the ASTM F1045 rating (a more rigorous standard than F1492), and the testing is described in more detail at this site: <http://www.hecc.net/prodtest.html>

Soft-foam Helmets have a hard plastic shell and a flexible and soft foam insert (most likely replaceable, and affixed with velcro or glue). Examples are Pro-tec's Classic Skate (any model with the word "Skate" in it); Triple 8's Brainsaver (Standard/Sweatsaver Liner); and S-One's Premium (non-certified) helmet.

Soft-foam helmets do not pass CPSC or HECC standards, and S-One states that no soft-foam helmet they tested met the requirements of ASTM F1492. Soft-foam helmets can not adequately protect your head from falls higher than 3.5 ft. The foam protective liner in the helmet is generally made of EVA foam, aka foam rubber. Over time and with each impact, this foam compresses and provides you with less and less protection every time you wear it. Soft-foam helmets that actually do meet the requirements of ASTM F1492 are able to withstand more than one **moderate** impact, but protection is provided for only a limited number of impacts. **After a single significant impact, a soft-foam helmet should be replaced.**

Hard-foam Helmets have a hard plastic shell, an EPS liner affixed to the hard plastic shell, and an additional/optional (and often replaceable) soft foam liner for comfort and sizing. Examples are Pro-tec's Ace and B2 (NOT Ace Skate and B2 Skate) - these two models are the only two that Pro-tec rates as multiple impact; Triple 8 Brainsaver CPSC; and S-One's Big Head, Destro, and Kid helmets.

Hard-foam helmets listed above pass CPSC standards and are not tested by HECC. Hard-foam helmets protect your head for a single impact by dispersing the energy of a crash. After a single significant impact, a hard foam helmet can no longer protect your head adequately and should be replaced. EPS is expanded polystyrene and does not bounce back to it's original shape after an impact. **After a single significant impact, a hard-foam helmet should be replaced.**

CPSC standards are the standards to which bicycle helmets are held, and you can read the entire standard here: <http://www.bhsi.org/cpscstd.htm> Pro-tec's Ace and B2 sport a liner with SXP (surface activated expanded poly-propylene) which Pro-tec says is a patented poly-propylene material that is designed to bounce back to it's original condition.

S-One supplies these two infographics on helmets:

There has been alot of confusion and misinformation about this topic...

What is the difference between a “Hard Foam” Helmet and a “Soft Foam” Helmet?



Hard Foam = CPSC Certified
Hard Foam = Skate Certified
Hard Foam = Most Protection
Hard Foam = California Legal



HARD FOAM HELMETS

aka: Certified Helmets , CPSC Helmets, Skate/Bike helmets, Single Impact Helmets, Eps Liner , Bike helmet, IDEA Liner etc...

Information about “Hard Foam” Helmets

- A “Hard Foam” helmet offers more protection than a “Soft Foam” helmet.
- “Hard Foam” helps pass the CPSC Test.
- “Hard Foam” helmets should be replaced after a big slam. “Single Impact”.
- If the “Hard Foam” liner is chipping, loose or dislodged from the plastic outer shell it should be replaced.
- “In the past “Hard Foam Helmets” tended to sit a bit higher on the head. The Destro Helmet and the Kid Helmet are designed to fit low on the head AND are comfortable. So there is no excuse not to wear a “Hard Foam” Helmet.



Soft Foam = Not CPSC Certified
Soft Foam = Not Skate Certified
Soft Foam = Less Protection
Soft Foam = Not Legal in CA



SOFT FOAM HELMETS

aka: Multiple Impact Helmets , 2-Stage Liner, EVA Foam, Old Style Skate, Classic Skate

Information about “Soft Foam” Helmets

- “Soft Foam” helmets cannot pass the CPSC or ASTM Test.
- “Soft Foam” helmets are NOT as protective as “Hard Foam” helmets
- It is illegal for a skateshop to sell “Soft Foam” helmets in some states.

HARD FOAM VS. SOFT FOAM

We highly recommend that ALL skaters regardless of age or skill wear a hard foam CPSC Certified helmet. A CPSC Certified helmet will protect your head up to **5x more** than a soft foam helmet. In the past, many skaters did not like hard foam helmets because they fit too high on the head and did not look as cool. In 2010, we designed our hard foam helmets (Kid Helmet, Destro Helmet & Lifer Helmet) to fit nice and low like a soft foam helmet. So you look good and you get maximum protection.

What is a hard foam / CPSC Certified helmet?

A hard foam helmet has a hard plastic outer shell and a hard EPS foam inner liner. The EPS foam is what enables the helmet to protect the head in the high impact test. If you slam hard, the EPS foam breaks apart and disperses energy. The hard EPS foam is the crucial element in protecting your head.

What is a soft foam / non-certified helmet?

If you are an older skateboarder it is probably what you grew up wearing. This helmet has a hard plastic outer shell and a soft foam / rubber liner. These helmets are comfortable but they are not as protective as a hard foam helmet. If you slam really hard the soft foam does NOT reduce the energy pulse adequately. Most helmet experts agree that you are better off wearing a soft foam helmet than no helmet at all. However, the soft foam helmet does not even come close to passing the CPSC impact testing process.

What is the CPSC Certified Test?

In order to pass the CPSC test a helmet must reduce a 1,000 G energy pulse to under 300 G's. A 1,000 G energy pulse is equivalent to falling roughly 7ft. to the ground or a 14 mph impact into a flat surface. A soft foam helmet fails to reduce the 1,000 G energy pulse to 300 G's. At it's best, a soft foam helmet can reduce the 1,000 G force down to 400. At it's worst, the soft foam helmet can only reduce the impact to 900 G's. Soft foam helmets only provide a very limited amount of protection.

Why should you wear a CPSC Certified helmet?

The brain is delicate and it doesn't heal like a knee or wrist. If you go down hard, you want your helmet to protect you. And tests clearly show that a soft foam helmet does not protect you as well as a hard foam CPSC Certified helmet.

IMPACT TEST



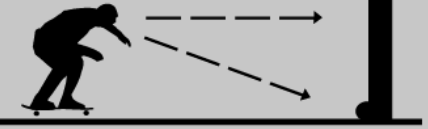
Drop Height 2.02 (m)
ie: Falling 7 Ft. to the ground

This impact creates an
energy pulse of 1,000+ G's.

In order to pass the CPSC test, a helmet must reduce a 1,000 G energy pulse to under 300 G's.

6.2 Impact Velocity (m/s)
ie: Hitting tree or curb at 14 mph

This impact creates an
energy pulse of 1,000+ G's.



CPSC TEST RESULTS:



The Hard Foam Helmet reduces energy pulse to 168 - 258 G's (**PASS**)

HARD FOAM = PASS



The Soft Foam Helmet only reduces energy pulse to 400 - 900 G's (**FAIL**)

SOFT FOAM = FAIL



Brand Information

S-One

S-One published this blog about their helmets and safety: <http://tinyurl.com/s-one-hardvssoft> as well as the above infographics on hard and soft helmets.

Pro-tec

Pro-tec states that two of their helmet models are “multiple impact” helmets: Ace and B2.

<http://pro-tec.net/ace-skate-helmet.php> (Ace model ONLY, not Ace Skate)

<http://pro-tec.net/b2-skate-helmet.php> (B2 model ONLY, not B2 Skate)

Both of these models use SXP foam to protect your head. The SXP foam is designed to bounce back to it's original condition after multiple impacts, but the the customer service rep stated that both of these helmets should still be replaced after a significant impact. It is not clear at this time how SXP is different from EPP foam.

Pro-tec's customer representative stated that all of their helmets should be replaced after one significant impact. The rep also stated that:

- The Classic and the Classic Skate helmets should both be replaced after ONE impact.
- The only helmets that they recommend for multiple moderate impacts are the Ace and the B2.
- Helmets with 2-stage foam liners degrade with each impact, and offer less and less protection the longer they are used.
- The representative I spoke with also said that they do not believe that their helmets are appropriate for roller derby and that they would recommend a helmet rated more along the lines of a hockey helmet.

Triple Eight

Triple Eight's Brainsaver line (except the CPSC certified Brainsaver) protects your head via 2-stage foam. This foam will degrade with each impact, and offer less and less protection the longer they are used. Helmets with 2-stage foam are unlikely to protect you in a crash, and tests show that they do not disperse force consistently from helmet to helmet.

The CPSC certified Brainsaver will protect your head for one impact.

Easton, Bauer, and Cascade

All manufacturers of hockey helmets are held to the same exacting standard, and tested by the HECC, CE, and CSA
Easton provides the following video about their S19 Z-Shock helmet: <http://www.youtube.com/watch?v=TmPOZHypXG4>

Easton also states “helmet manufacturer’s have been challenged to “prove” how protective they are and very often slice and dice the data in a way that puts them in the best light. From an impact standpoint, our tests (internal and third party) show that the best helmets in the market (S19, Bauer 9900 and Cascade M11) have performance averages that are within +/- 5% of each other.”

Nutcase

According to Nutcase’s online store, they are producing a helmet made out of the same EPP foam as hockey helmets. From their site:

“Nutcase’s new single AND multiple impact helmet! Complies with single impact CSPC standard for bike helmets and the ASTM F 1492 multiple lower-impact skateboard standard! The Crossover comes with an injection-molded ABS shell, Expanded Polypropylene (EPP) protective inner foam for high impact and multiple impact protection, three sets of removable low-density polyurethane foam insert liners for comfort and for refining fit, an anti-pinch, Magnetic Buckle for one-hand operation, 360 degree reflectivity in front, back and side Nutcase logos and it comes in two sizes: S/M (48 cm-54 cm) and L/XL (55 cm to 61 cm).”

<http://store.nutcasestore.com/crossover.html>

This helmet seems like it will also offer safe multiple-impact protection, however, it is not yet for sale.

Other models of Nutcase, including all models in their Street collection are EPS single impact helmets.

Researched by Nina Faile, April 2011

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